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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/755,244      | 01/10/2004  | John M. Brookfield   | A3184Q1-US-NP       | 9652             |

7590 08/01/2006

Patent Documentation Center  
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Xerox Square 20th Floor  
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Rochester, NY 14644

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| EXAMINER |
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FIDLER, SHELBY LEE

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| ART UNIT | PAPER NUMBER |
|----------|--------------|

2861

DATE MAILED: 08/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/755,244 | <b>Applicant(s)</b><br>BROOKFIELD ET AL. |  |
|                              | <b>Examiner</b><br>Shelby Fidler     | <b>Art Unit</b><br>2861                  |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some    \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/30/2006</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Allowable Subject Matter*

The indicated allowability of claims 8-11 is withdrawn in view of the newly discovered reference(s) to Sugitani et al. (US 4905017). Rejections based on the newly cited reference(s) follow.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 12, 14, 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Endo (US 6325489 B2).

**Endo teaches the following:**

**\*regarding claim 12, a drop emitting device comprising:**

a non-slanted pair of nozzles (e.g. nozzle positions K<sub>1</sub> and C<sub>1</sub>, Drawing A below) aligned along an X-axis (Drawing A) and substantially parallel to a Y-axis that is orthogonal to the X-axis (Drawing A)

a slanted pair of nozzles (e.g. nozzle positions Y<sub>1</sub> and m<sub>2</sub>, Drawing A) offset along the X-axis so as to be slanted relative to the X-axis (Drawing A);

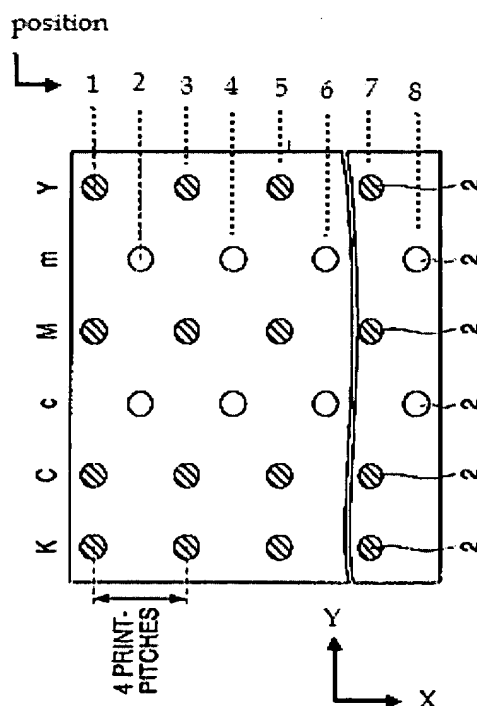
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wherein the slanted pair of nozzles is displaced from the non-slanted pair of nozzles along the Y-axis (Drawing A);

wherein the slanted pair of nozzles emit drops of a first color (yellow) and drops of a second color (light magenta), the second color being different from the first color (col. 4, lines 52-60 and Fig. 7A)

**\*regarding claim 14**, one of the nozzles of the slanted pair of nozzles (e.g. nozzle position Y<sub>1</sub>, Drawing A) is aligned along the X-axis with the non-slanted pair of nozzles (e.g. nozzle position C<sub>1</sub>, Drawing A)

**\*regarding claim 15**, the non-slanted pair of nozzles emit drops of a first color (black) and drops of a second color (cyan, col. 4, lines 52-60 and Fig. 7A)



Drawing A: Figure 7A from Endo '489, edited for clarification

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanda et al. (US 6502921 B2) in view of Sugitani et al. (US 4905017).

**Kanda et al. teach the following:**

**\*regarding claim 1, a drop emitting device comprising:**

a first linear array (element 12, Fig. 5) of side by side substantially mutually parallel first columnar arrays (col. 2, lines 48-50 and Fig. 5) of drop emitting nozzles (nozzles 1, Fig. 6), the first linear array extending along an X-axis (vertical axis of Fig. 5), and the first columnar arrays being oblique to the X-axis (Fig. 5);

a second linear array (element 11, Fig. 5) of side by side substantially mutually parallel second columnar arrays (col. 2, lines 48-50 and Fig. 5) of drop emitting nozzles (nozzles 1, Fig. 6), the second linear array extending along the X-axis and being adjacent the first linear array along a Y-axis that is orthogonal to the X-axis (vertical axis of Fig. 5), and the second columnar arrays being oblique to the X-axis (Fig. 5);

each second columnar array having an associated first columnar array displaced therefrom along the Y-axis (Fig. 5);

each nozzle from the first columnar arrays has an associated nozzle from the second columnar arrays displaced therefrom along a Y-axis (Figs. 5 and 6)

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**\*regarding claim 20, a drop emitting device comprising:**

a first linear array (element 12, Fig. 5) of columnar arrays (col. 2, lines 48-50 and Fig. 5), the first linear array extending along an X-axis (vertical axis of Fig. 5) and the columnar arrays of first nozzles extending obliquely to the X-axis (Fig. 5);

a second linear array (element 11, Fig. 5) of columnar arrays (col. 2, lines 48-50 and Fig. 5), the second linear array extending along the X-axis (vertical axis of Fig. 5) and the columnar arrays of second nozzles extending obliquely to the X-axis (Fig. 5);

wherein the first linear array and the second linear array extend along a X-axis (Fig. 5), and wherein the second linear array is adjacent the first linear array (Fig. 5) such that each nozzle from the first columnar arrays has an associated nozzle from the second columnar arrays displaced therefrom along a Y-axis that is orthogonal to the X-axis (Figs. 5 and 6)

**Kanda et al. do not expressly teach the following:**

**\*regarding claim 1, each first columnar array of drop emitting nozzles comprised of a first linear sub-column of N nozzles that is interleaved with and substantially parallel to an associated second linear sub-column of N nozzles so as to form N first pairs of nozzles, wherein each first pair of nozzles includes a nozzle from the first linear sub-column and an adjacent nozzle from the second linear sub-column, and wherein N is greater than 1;**

wherein the nozzles of each first pair of nozzles are aligned along the X-axis and substantially parallel to a Y-axis that is orthogonal to the X-axis;

wherein the first linear sub-columns of nozzles emit drops of a first color and the second linear sub-columns emit drops of a second color;

each second columnar array of drop emitting nozzles comprised of a third linear sub-column of N nozzles that is interleaved with and substantially parallel to an associated fourth

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linear sub-column of N nozzles so as to form N second pairs of nozzles, wherein each second pair of nozzles includes a nozzle from the third linear sub-column and an adjacent nozzle from the fourth linear sub-column;

each nozzle from the first columnar array is part of a nozzle pair and each nozzle from the second columnar array is part of a nozzle pair;

wherein the nozzles of each second pair of nozzles are offset along the X-axis;

wherein the third linear sub-columns of nozzles emit drops of a third color and the fourth linear sub-columns of nozzles emit drops of a fourth color; and

wherein each of the first through fourth linear sub-columns has a nozzle pitch  $XP$  inches along the X-axis

**\*regarding claim 20**, the first columnar arrays have first nozzle pairs;

wherein the nozzles of each first nozzle pair are aligned along the X-axis;

wherein one nozzle of each first nozzle pair emits drops of a first color and another nozzle of each first nozzle pair emits drops of a second color different from the first color;

the second columnar arrays have second nozzle pairs;

wherein the nozzles of each second nozzle pair are offset along the X-axis;

wherein one nozzle of each second nozzle pair emits drops of a third color and another nozzle of each second nozzle pair emits drops of a fourth color;

each nozzle from the first columnar array is part of a nozzle pair and each nozzle from the second columnar array is part of a nozzle pair

**Sugitani et al. teach the following:**

**\*regarding claim 1**, each first columnar array of drop emitting nozzles (e.g. row of nozzles 639 of Fig. 6) comprised of a first linear sub-column of N nozzles (those nozzles 639

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corresponding to ink passage 636-1, Fig. 6) that is interleaved with and substantially parallel to an associated second linear sub-column of N nozzles (those nozzles 639 corresponding to ink passage 636-2, Fig. 6) so as to form N first pairs of nozzles (any two adjacent nozzles 639 of Fig. 6), wherein each first pair of nozzles includes a nozzle from the first linear sub-column and an adjacent nozzle from the second linear sub-column (Fig. 6), and wherein N is greater than 1 (Fig. 6);

wherein the nozzles of each first pair of nozzles are aligned along the X-axis (the direction of the row of nozzles 639 of Fig. 6 reads as the X-axis) and substantially parallel to a Y-axis that is orthogonal to the X-axis (Fig. 6);

wherein the first linear sub-columns of nozzles emit drops of a first color (that color corresponding to ink passage 636-1) and the second linear sub-columns emit drops of a second color (that color corresponding to ink passage 636-2);

each second columnar array of drop emitting nozzles (the row of nozzles 859 of Fig. 8) comprised of a third linear sub-column of N nozzles (those nozzles 859 corresponding to ink passage 856-1, Fig. 8) that is interleaved with and substantially parallel to an associated fourth linear sub-column of N nozzles (those nozzles 859 corresponding to ink passage 856-2, Fig. 8) so as to form N second pairs of nozzles (any two diagonally adjacent nozzles 859 of Fig. 8), wherein each second pair of nozzles includes a nozzle from the third linear sub-column and an adjacent nozzle from the fourth linear sub-column (Fig. 8);

each nozzle from the first columnar array is part of a nozzle pair (Fig. 6) and each nozzle from the second columnar array is part of a nozzle pair (Fig. 8);

wherein the nozzles of each second pair of nozzles are offset along the X-axis (Fig. 8);



wherein the third linear sub-columns of nozzles emit drops of a third color (that color corresponding to ink passage 856-1) and the fourth linear sub-columns of nozzles emit drops of a fourth color (that color corresponding to ink passage 856-2); and

wherein each of the first through fourth linear sub-columns has a nozzle pitch  $XP$  inches along the X-axis (Figs. 6 and 8)

**\*regarding claim 20**, the first columnar arrays (e.g. row of nozzles 639 of Fig. 6) have first nozzle pairs (any two adjacent nozzles 639 of Fig. 6);

wherein the nozzles of each first nozzle pair are aligned along the X-axis (Fig. 6; where the direction of the row of nozzles 639 reads as the X-axis);

wherein one nozzle of each first nozzle pair emits drops of a first color (that color corresponding to ink passage 636-1) and another nozzle of each first nozzle pair emits drops of a second color different from the first color (that color corresponding to ink passage 636-2; Fig. 6 and col. 5, lines 60-66);

the second columnar arrays (e.g. row of nozzles 859 of Fig. 8) have second nozzle pairs (any two diagonally adjacent nozzles 859 in Fig. 8);

wherein the nozzles of each second nozzle pair are offset along the X-axis (Fig. 8);

wherein one nozzle of each second nozzle pair emits drops of a third color (that color corresponding to ink passage 856-1) and another nozzle of each second nozzle pair emits drops of a fourth color (that color corresponding to ink passage 856-2; Fig. 8 and col. 5, line 60 – col. 6, line 8);

each nozzle from the first columnar array is part of a nozzle pair (Fig. 6) and each nozzle from the second columnar array is part of a nozzle pair (Fig. 8)

At the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize Sugitani et al.'s nozzle sub-columns into the Kanda et al.'s invention. The motivation for doing so, as taught by Sugitani et al., is to provide a liquid-jetting head suited for multicolor or full-color recording (col. 2, lines 11-13).

Claims 3-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanda et al. (US 6502921 B2) in view of Sugitani et al. (US 4905017), as applied to claim 1 above, and further in view of Usui et al. (US 6033058).

**Kanda et al. as modified by Sugitani et al. teach the following:**

**\*regarding claim 7**, the second nozzles are aligned along the X-axis with the associated first pair of nozzles (Figs. 5 and 6 of Kanda et al.)

**\*regarding claim 8**, the first and second colors are cyan and magenta (col. 4, lines 4-9 and col. 6, lines 60-66 of Sugitani et al.)

**\*regarding claim 9**, the second and third colors are yellow and black (col. 4, lines 4-9 and col. 6, lines 60-66 of Sugitani et al.)

**\*regarding claim 10**, the first and second colors are cyan and magenta (col. 4, lines 4-9 and col. 6, lines 60-66);

the second and third colors are yellow and black (col. 4, lines 4-9 and col. 6, lines 60-66 of Sugitani et al.)

**Kanda et al. as modified by Sugitani et al. do not expressly teach the following:**

**\*regarding claim 3**, each of the first through fourth sub-columns of nozzles has a nozzle pitch XP of at most about 1/75 inches along the X-axis

**\*regarding claim 4**, each of the first through fourth sub-columns of nozzles has a nozzle pitch  $XP$  of at most about  $1/37.5$  inches along the X-axis

**\*regarding claim 5**, the nozzles of each second pair of nozzles are offset along the X-axis by about  $XP/3$  inches

**\*regarding claim 6**, the nozzles of each second pair of nozzles are offset along the X-axis by at most about 0.005 inches

**\*regarding claim 7**, the second nozzles and the first nozzles are in pairs

**\*regarding claim 8**, the first and second colors are cyan and magenta

**\*regarding claim 9**, the second and third colors are yellow and black

**\*regarding claim 10**, the first and second colors are cyan and magenta;

the second and third colors are yellow and black; and

each second nozzle pair is offset relative to its associated first nozzle pair along the X-axis

**\*regarding claim 11**, a first plurality of finger manifolds fluidically coupled to the first linear sub-columns of nozzles;

a second plurality of finger manifolds fluidically coupled to the second linear sub-columns;

a third plurality of finger manifolds fluidically coupled to the third linear sub-columns; and

a fourth plurality of finger manifolds fluidically coupled to the fourth linear sub-columns

**Usui et al. teach the following:**

**\*regarding claims 3 and 4**, each of the first through fourth sub-columns of nozzles has a nozzle pitch XP of at most about  $1/37.5$  inches along the X-axis ( $1/90$  inches, col. 4, lines 36-39)

**\*regarding claim 5**, the nozzles of each second pair of nozzles are offset along the X-axis by about  $XP/3$  inches ( $1/360$  inches, where XP is read as  $1/90$  inches, col. 4, lines 36-43)

**\*regarding claim 6**, the nozzles of each second pair of nozzles are offset along the X-axis by at most about 0.005 inches ( $1/360$  inches  $\approx$  0.0027 inches, col. 4, lines 40-43)

**\*regarding claim 7**, the second nozzles and the first nozzles are in pairs (e.g. pair of nozzle openings 61a and 62a, Fig. 8)

**\*regarding claim 10**, each second nozzle pair (e.g. 60a and 61a) is offset relative to its associated first nozzle pair (e.g. 53a and 54a) along the X-axis (Fig. 8)

**\*regarding claim 11**, a first plurality of finger manifolds (right-hand extensions of common ink chambers 23 corresponding to linear arrays 53, Figs. 1 and 8) fluidically coupled to the first linear sub-columns of nozzles (col. 3, lines 42-51);

a second plurality of finger manifolds (left-hand extensions of common ink chambers 23 corresponding to linear arrays 54, Figs. 1 and 8) fluidically coupled to the second linear sub-columns (col. 3, lines 42-51);

a third plurality of finger manifolds (right-hand extensions of common ink chambers 23 corresponding to linear arrays 60, Figs. 1 and 8) fluidically coupled to the third linear sub-columns (col. 3, lines 42-51); and

a fourth plurality of finger manifolds (left-hand extensions of common ink chambers 23 corresponding to linear arrays 61, Figs. 1 and 8) fluidically coupled to the fourth linear sub-columns (col. 3, lines 42-51)

At the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize Usui et al.'s nozzle pitch into the invention of Kanda et al. as modified by Sugitani et al. The motivation for doing so, as taught by Usui et al., is to vary the resolution and print different colors (abstract).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kanda et al. (US 6502921 B2) as modified by Sugitani et al. (US 4905017), as applied to claim 1 above, and further in view of Ericksen (US 5079571).

**Kanda et al. as modified by Sugitani et al. teach the following:**

**\*regarding claim 2**, the first linear array of side by side substantially mutually parallel columnar arrays of drop emitting nozzles and the second linear array of side by side mutually columnar arrays of drop emitting nozzles emit drops of ink (col. 2, lines 48-54 of Kanda et al.)

**Kanda et al. as modified by Sugitani et al. do not expressly teach the following:**

**\*regarding claim 2**, the ink is melted solid ink

**Ericksen teaches the following:**

**\*regarding claim 2**, the ink is melted solid ink (col. 3, lines 65-67)

At the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize melted solid ink into the invention of Kanda et al. as modified and Sugitani et al. The motivation for doing so, as taught by Ericksen, is that the two types of inks are art-recognized equivalents (col. 3, lines 65-67).

Claim 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Endo (US 6325489 B2) in view of Torgerson et al. (US 6523935 B2).

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**Endo teaches all claimed limitations except the following:**

**\*regarding claim 13**, the nozzles of the slanted pair of nozzles are offset along the X-axis by at most 0.005 inches

**Torgerson et al. teach the following:**

**\*regarding claim 13**, the nozzles of the slanted pair of nozzles are offset along the X-axis by at most 0.005 inches (1/300 inches, col. 4, lines 53-58)

At the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize Torgerson's nozzle pitch into Endo's invention. The motivation for doing so, as taught by Torgerson, is to achieve a certain resolution (col. 5, lines 6-11).

Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Endo (US 6325489 B2) in view of Bloomberg (US 6425653 B1).

**Endo teaches the following:**

**\*regarding claim 17**, the non-slanted pair of nozzles emit cyan drops and black drops (Fig. 7A)

**\*regarding claim 18**, the slanted pair of nozzles emit yellow drops and light magenta drops (Fig. 7A)

**\*regarding claim 19**, the non-slanted pair of nozzles emit cyan drops and magenta drops (Fig. 7A), and wherein the slanted pair of nozzles emit yellow drops and black drops (Fig. 7A)

**Endo does not expressly teach the following:**

**\*regarding claim 17**, emitting magenta drops instead of black drops

**\*regarding claim 18**, emitting black drops instead of light magenta drops

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**\*regarding claim 19, emitting magenta drops instead of black drops and emitting black drops instead of light magenta drops**

**Bloomberg teaches the following:**

**\*regarding claims 17, 18, and 19, emitting magenta drops instead of black drops and emitting black drops instead of light magenta drops (col. 6, lines 22-28)**

At the time of invention, it would have been obvious to a person of ordinary skill in the art to utilize magenta drops instead of black drops in Endo's invention. The motivation for doing so, as taught by Bloomberg, is to print text in a desired color (col. 6, lines 22-28).

#### ***Response to Arguments***

Applicant's arguments with respect to claims 1 and 3-7 have been considered but are moot in view of the new ground(s) of rejection. Please see the above rejection, Kanda et al. (US 6502921 B2) in view of Sugitani et al. (US 4905017).

*Communication with the USPTO*

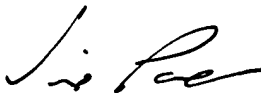
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shelby Fidler whose telephone number is (571) 272-8455. The examiner can normally be reached on MWF 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vip Patel can be reached on (571) 272-2458. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SF 7/21/06

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